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I, KIM MARSHALL , MANAGER EXAMINATION SUPPORT AND SALES, hereby certify that the annexed are true copies of the Provisional specification in connection with Application No. PO 6393 for a patent by UNISEARCH LIMITED filed on 24 April 1997.

I further certify that the annexed specification is not, as yet, open to public inspection.

PRIORITY DOCUMENT

WITNESS my hand this First
day of May 1998

KIM MARSHALL
MANAGER EXAMINATION SUPPORT AND SALES

P/00/009

Regulation 3.2

AUSTRALIA

Patents Act 1990

PROVISIONAL SPECIFICATION

Invention Title: OIL FROM WATER SEPARATOR

The invention is described in the following statement:

Our Ref: U971005

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OIL FROM WATER SEPARATOR

The present application relates to oil from water separators and, more particularly, such separators suitable for use in inground or aboveground installations where it is desired to prevent oil concentrations above a predetermined limit from distribution to the environment in an uncontrolled fashion.

BACKGROUND

Mechanical oil from water separator systems are known. Devices/systems are also known that provide settling in chambers separated by baffles - refer the arrangement of Fig. 1 which shows a Prior Art American Petroleum Institute oil from water separator design. It consists of a rectangular tank with two or more vertical partitions to separate entry chamber, oil disengagement chamber and effluent water chamber, and which is designed to run full of water.

The API oil from water separator is sized to provide low turbulence conditions and sufficient residence time for oil globules with a minimum diameter of 0.015 cm (150 microns) to separate from the oil/water mixture flowing though the separator.

This prior art system can be characterised as a decant-type system where for every input of liquid there is an output of a similar amount at the same time, thereby affecting separation efficiency.

It is an object of the present invention to provide an arrangement which improves the performance of such a basic arrangement.

BRIEF DESCRIPTION OF INVENTION

In one broad form of the invention there is provided an oil from water separation system including an oil disengagement chamber having a flush storage volume defined between a chamber high liquid level and a chamber low liquid level; said flush storage volume caused to exit from said chamber on attainment of said chamber high liquid level.

Preferably said flush storage volume is caused to exit by means of a siphon mechanism.

In a further broad form of the invention there is provided an oil from water separator including an oil disengagement chamber adapted to receive an oil/water mixture and retain it for a sufficient time in a relatively undisturbed state whereby oil in the mixture floats to the top of the mixture resulting in a substantially oil free volume of water having a layer of oil derived from said oil and water mixture floating on the surface thereof; characterised in that outflow from said chamber is prevented until said mixture reaches a predetermined chamber high liquid level whereupon said volume of water is caused to exit said chamber.

BRIEF DESCRIPTIONS DRAWINGS

One embodiment of the invention will now be described with reference to the accompanying drawings wherein: -

Fig 1 illustrates a Prior Art separator and

Fig 2 illustrates a separator system according to a first embodiment of the system.

Fig. 3 illustrates the sequence of filling and emptying of the separator system of Fig. 2.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

The Prior Art separator (10) of Fig 1 comprises an entry chamber (11) separated by a baffle (12) from an oil disengagement chamber (13) which, in turn, is separated from an effluent water chamber (15) by a barrier (14).

With reference to Fig 2 an oil from water separator system (20) according to a first embodiment of the invention is illustrated.

Fig. 3 shows a series of operating conditions A - E.

The system (20) comprises an influent of oily water through a baffle (12) to an oil disengagement chamber (21) the water from which passes beneath a skimmer wall or second baffle 14 to a siphon pipe (22) in an end wall (16). This siphon pipe (22) connects to a draw off tank (23) which, in turn, allows exit of liquid above a predetermined level (24) via exit pipe (25).

The siphon pipe (22), in operation, causes the level of liquid (26) in oil disengagement chamber (21) to move between high level (27) and low level (28).

The volume of liquid defined between these two levels is designated the flush storage volume (29).

In use water laden with oil enters oil disengagement chamber (21) as in A of Fig 3 with the level in tank (21) rising until flush storage volume (29) is achieved at which time siphon pipe (22) operates to cause the flush storage volume (29) to exit into draw off tank (23) until the siphon breaks at low level (28). Low level (28) is selected to be, for most conditions, above the oil residue level expected in the oil disengagement chamber (21).

As more oil laden water enters oil disengagement chamber (21) the process repeats itself in accordance with Fig 3 C, D, E.

In this manner a relatively large volume of oil/water mixture is retained for a relatively long period of time to allow oil separation to occur prior to siphoned exit.

Restated in other terms: A feature of this embodiment is the incorporation of one or more automatic siphons which release water only periodically from an oil disengagement chamber and which chamber creates a potential storage for a selected volume of first flush oil/water mixture or a major oil spillage of a volume equal to the flush storage volume (29).

This volume (29) is sized for and progressively filled with oil/water mixture from successive rainfall events or from a major oil spillage. Until this volume (29) is accumulated, oil globules can coalesce and separate from the water over a period much greater than the residence time available in the standard through-flow separator of Fig. 1. The oil disengagement chamber (21) is quiescent with virtually zero turbulence except at the end of each cycle when the siphon is operating.

When the water surface reaches a selected chamber high liquid level (27) a siphon in the effluent water chamber (23) is primed and substantially oil-free water is released until the water surface falls to a selected chamber low liquid level (28) at which the siphon breaks. This release of water creates the flush storage volume (29) for the next cycle of oil/water inflows.

An optional addition to the novel design consists of an automatic siphon flow control valve (not shown) which stops the water release if oil rather than water is present at the outlet of the effluent water chamber (23). This flow control valve operates on the principle of a valve-closing mechanism which has an effective specific gravity between that of water (1.0) and that of oil (usually less than 0.95). The valve-closing mechanism rises in water and sinks in oil, in the same way as a hydrometer.

This would permit the use of a substantially larger volume of the oil/water separator for storage of spilled oil in an emergency.

The above describes only one embodiment of the present invention and modifications obvious to those skilled in the art can be made thereto without departing from the scope and spirit of the present invention.

For example, in alternative arrangements, the siphon could be replaced with a pumped system actuated between the high and low levels by limit switches.

CLAIMS

1. An oil from water separation system including an oil disengagement chamber having a flush storage volume defined between a chamber high liquid level and a chamber low liquid level; said flush storage volume caused to exit from said chamber on attainment of said chamber high liquid level.

2. The system of Claim 1 wherein said flush storage volume is caused to exit by means of a siphon mechanism.

3. An oil from water separator including an oil disengagement chamber adapted to receive an oil and water mixture and retain it for a sufficient time in a relatively undisturbed state whereby oil in the mixture floats to the top of the mixture resulting in a substantially oil free volume of water having a layer of oil derived from said oil and water mixture floating on the surface thereof; characterised in that outflow from said chamber is prevented until said mixture reaches a predetermined chamber high liquid level whereupon said volume of water is caused to exit said chamber.

4. The separator of Claim 3 wherein, on reaching said chamber high liquid level, outflow is initiated and maintained until a predetermined chamber low liquid level in said chamber is reached at which time outflow is terminated.

5. The separator of Claim 3 or Claim 4 wherein said outflow is controlled by means sensitive to said chamber high liquid level and said chamber low liquid level.

6. The separator of any one of Claims 3-5 wherein said outflow is drawn from a point at said predetermined low level in said mixture.

7. The separator of Claim 5 or Claim 6 wherein said means sensitive to said chamber high liquid level and said chamber low liquid level is a siphon.

8. The separator of Claim 5 or Claim 6 wherein said means sensitive is a level switch actuated pumping system.

Dated this 24th day of April 1997.

Patent Attorney for the Applicant:

PETER CHAMBERLAYNE DUMMER

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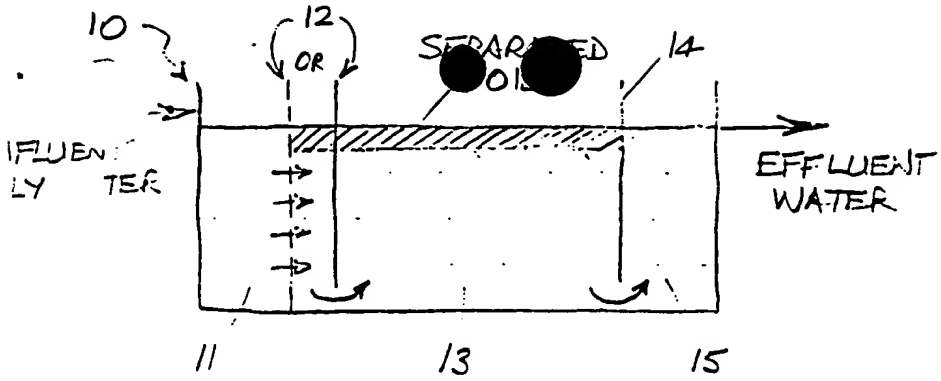
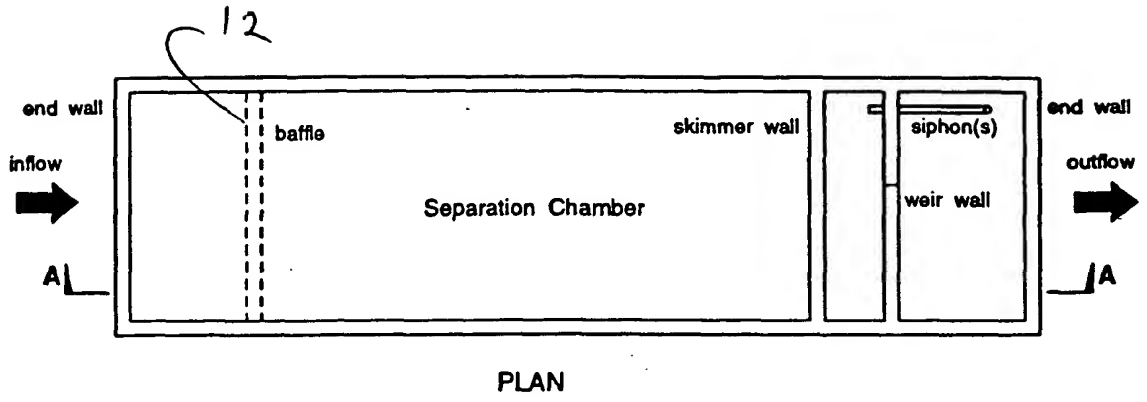
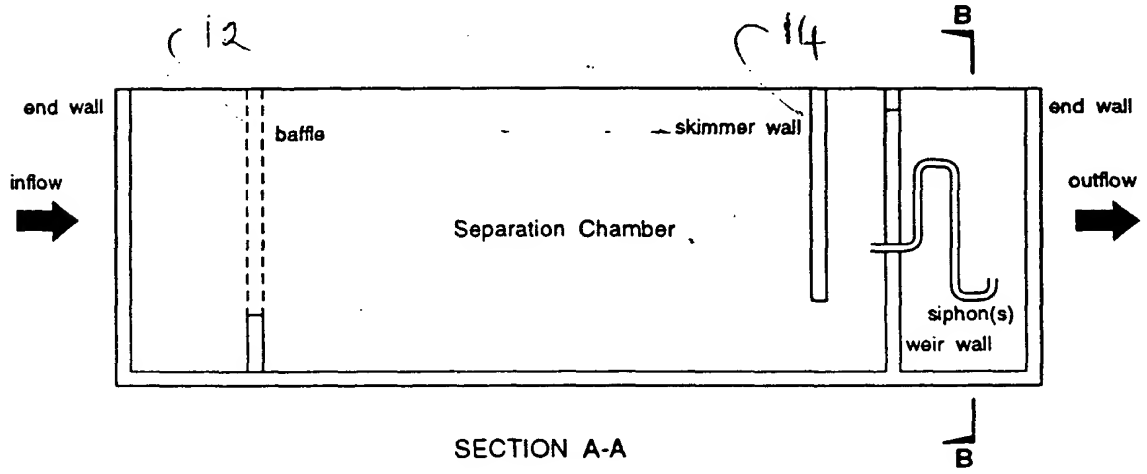


PRIOR ART

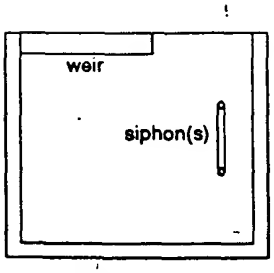
FIG. 1



PLAN



SECTION A-A



SECTION B-B

NOT TO SCALE

OIL WATER SEPARATOR

FIGURE 2

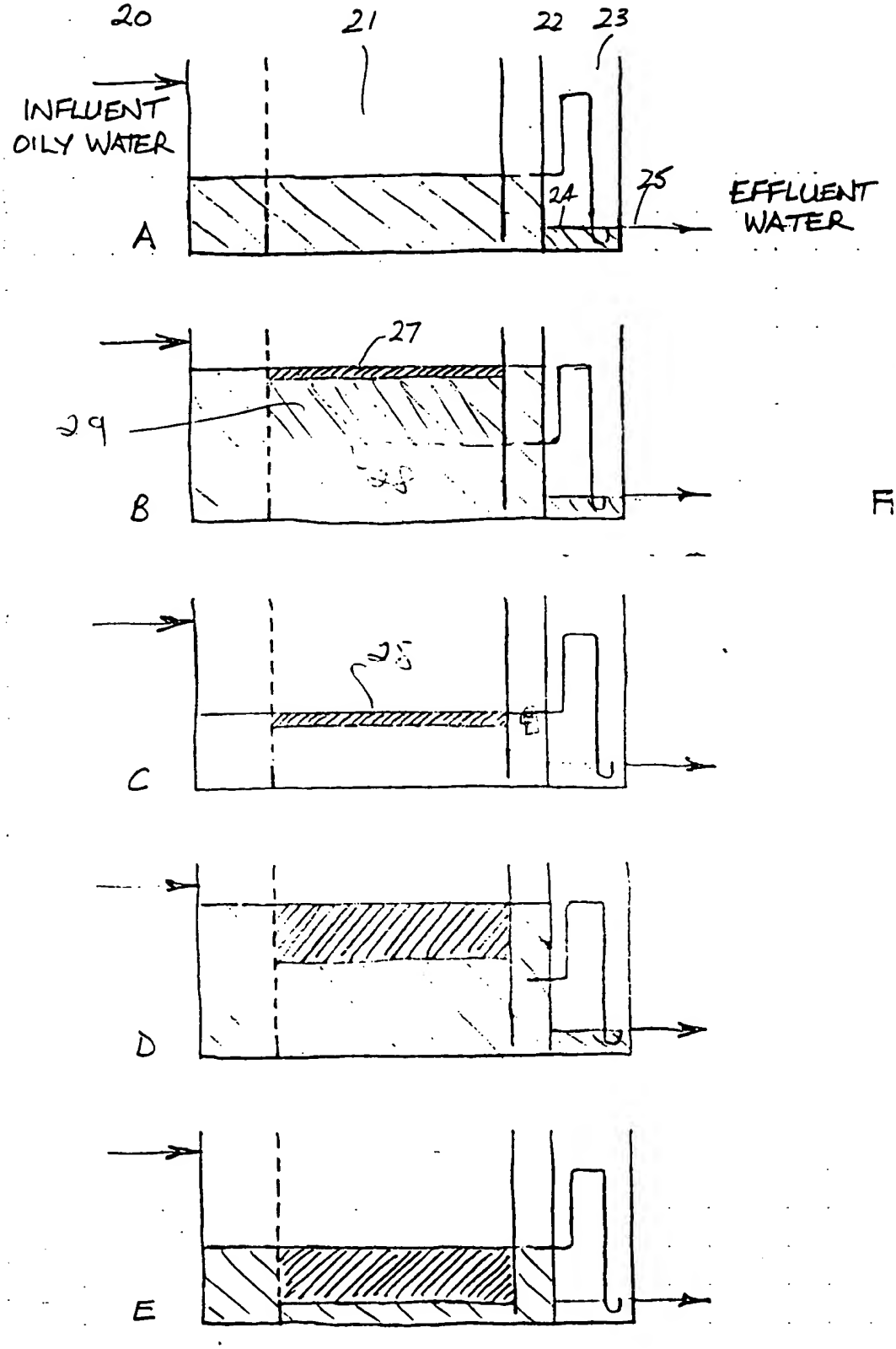


FIGURE 3

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